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William A. Goddard III

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MINTZ, LEVIN, COHN, FERRIS, GLOVSKY AND POPEO, P.C
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EXAMINER

MCCRACKEN, DANIEL

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

04/29/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/719,000	Applicant(s) GODDARD ET AL.	
	Examiner DANIEL C. MCCracken	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 2/19/2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/19/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Citation to the Specification will be in the following format (S. # : ¶) where # denotes the page number and ¶ denotes the paragraph number. Citation to patent literature will be in the form (Inventor # : LL) where # is the column number and LL is the line number. Citation to the pre-grant publication literature will be in the following format (Inventor # : ¶) where # denotes the page number and ¶ denotes the paragraph number.

Response to Arguments

Information Disclosure Statement

Applicants IDS filed 2/19/2008 has been received and will be considered. In their Remarks, Applicants have stated that a “cursory search of the USPTO patent database” has been performed. (Remarks of 2/19/2009 at 9). The results of this search should be submitted. Furthermore, and as noted in previous office actions, the listing of references in the Specification is improper. If Applicants want any of these references formally considered, they must be submitted on an Information Disclosure Statement.

Claim Rejections - 35 U.S.C. §§102-103

With respect to the rejection over Applicants admissions, Applicants recite “The Action provides, *inter alia*, the following quote from the May 23 response:” (followed by a quote from the Final Office Action dated 8/17/2007). It is the “*inter alia*” that Applicants fail to focus on. This is addressed in the new rejections that appear forthwith. All remaining art rejections are moot in light of the new rejections appearing herein.

Claim Construction

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Applicants have persisted in disputing the Examiner's construction of "pillared." The Examiner's prior claim construction was improvidently made and as such, the claim construction is withdrawn. All claims will receive their broadest reasonable interpretation. *See also* Claim Rejections, 35 U.S.C. §112, ¶2 *infra*.

Claim Rejections – 35 U.S.C. §112, ¶1 Enablement

Applicants have presented several journal articles, presumably as evidence of enablement. Four of these (Ma, Chun, Chen, and Mulfort) are post-filing date publications (2005, 2005, 2007 and 2007, respectively). As such, *they have absolutely no relevance to the enablement inquiry*, which of course examines the disclosure when filed. MPEP 2164.01, 2164.05 (Specification Must be Enabling as of the Filing Date). Diederich was published pre-filing date (1997). Diederich generally discusses Diels-Alder functionalization of fullerenes. The claims are not directed towards fullerenes, however, assuming fullerenes are to be construed as the carbon nanostructures of Claim 4, there is still insufficient support to show the ability to make a "pillar" based on the disclosure of Diederich. Alternatively, maybe Diederich teaches a "pillar," in which case it clearly anticipates Applicants claims. *See* Claim Rejections, 35 U.S.C. §102 *infra*.

The gravamen of the rejection comes from the language of the statute itself, which states that "[t]he specification shall contain a written description of the invention, and of the **manner and process of making and using it**, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention." 35 U.S.C. 112, ¶1. (emphasis added). Where do applicants set for the "manner and process of making 'it'?" If the

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language at (S. 10: [00041]) is to be taken as the manner and process of making and using it, then this is insufficient. The fact remains that Applicants cannot point to any process of making the invention, because no such process exists. It exists on a hard drive. (S. 13: [00049] *et seq.*) Atoms were plucked from a drop-down menu on some software and arranged on a screen. Unless the Examiner has missed a major advance in the chemical arts wherein a chemist can type a compound into a computer and have a composition of matter come out of the disc drive, the disclosure is not enabled.

The Examiner would welcome experimental evidence of making the composition of Claim 1. Any evidence submitted of course should be in appropriate affidavit or declaration form, recognizing the penalties for making false statements under 18 U.S.C. 1001. Such evidence should address the *In re Wands* factors, chronicling how a composition of claim 1 could be made by one of ordinary skill in the art with the guidance in the specification. The amount of experimenting should be detailed. If the composition is produced with a computer, this should be elaborated on in detail. The enablement rejection is elaborated on in the claim rejections *infra*.

Claim Rejections – 35 U.S.C. §112, ¶1 Written Description

Applicants state “The four references described above also provide evidence that the instant specification provides sufficient written description for the instant claims.” Extraneous references have no relevance to the written description analysis. Furthermore, and as noted above, if anything the references demonstrate that someone else possessed some real chemistry after the filing of this application.

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Taking Applicants at their word that “the true inquiry relevant to written description [is] whether the claimed invention is described sufficiently such that the skilled artisan can reasonably conclude that the inventor had possession of the claimed invention” (Remarks of 2/19/2008, p. 13), then clearly the disclosure fails. Possession of a composition on a computer screen is not the same as possessing it in real life, in a patent application, or otherwise. If – accordingly to Applicants – “the inventive aspect of a novel material is largely or wholly contained within the idea for the material itself,” would any idea expressed in a patent application demonstrate possession of the claimed invention to the skilled artisan? The Examiner has an idea for a drug that will cure AIDS, cancer, obesity, and hair loss. It is a composition of matter that comprises hydrogen, carbon, nitrogen, oxygen, phosphorous and sulfur. One embodiment (which the Examiner is typing into a computer, so therefore it must exist in real life) is this: “H-C-N-O-P-S.” Does the Examiner have possession of this cancer cure? The Examiner’s hypothetical specification states “Any suitable reaction can be used to make this composition.” However, this is not enablement.

The written description rejection is elaborated on in the claim rejections *infra*.

Request for Information

The Examiner requests the results of any search made by Applicants. It is noted that Applicants have stated on and for the record that one has been made. *See* (Remarks of 2/19/2008, p. 9).

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

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The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-43 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The methodology adopted by the Office for determining the adequacy of the written description is set forth in MPEP 2163, *et seq.* The Examiner recognizes and appreciates the strong presumption that an adequate written description of the claimed invention is present when the application is filed. *See In re Werthheim*, 541 F.2d 257, 262, 191 USPQ 90, 96 (CCPA 1976). Further, the Examiner recognizes and appreciates the burden is on the Office to present evidence or reasons why one skilled in the art would not recognize that the written description provides support for the claims. As such, the Examiner makes the following findings of fact in accordance with the Office methodology as set forth at MPEP 2163 II. (“Methodology for Determining Adequacy of Written Description”).

Read and Analyze the Specification for Compliance with 35 U.S.C. 112, para. 1

1. For Each Claim, Determine What the Claim as a Whole Covers:

As the MPEP recognizes, “[c]laim construction is an essential part of the examination process.” MPEP 2163 II A. 1. Applicants have defined “pillared material.” *See* (S. 7: [00028]). This definition creates more problems than it resolves. The definition starts out benign enough, stating that “pillared carbon

material,’ refers to an alteration in a carbon material in which parts of the carbon material are separated from each other.” *Id.* However, Applicants go on to say “no particular form of structure is necessarily intended by the use of this terminology,” but “the ‘pillared’ carbon material alteration is intended to be stable and allow for further processing . . . without disruption of the pillared structure.” *Id.* Translated, Applicants state that no structure is intended (i.e. pillared material can be any structure) but the structure gives it stable properties. Notwithstanding the fact that Applicants have conducted absolutely no testing to determine whether these mechanical properties are in fact present, Applicants – by their own choice of language in their own definition – have precluded a targeted search or any reasonable claim construction with any claim construction analysis. While it is well settled that Applicants can be their own lexicographer, this rule was created with the recognition that technology may outpace language, and that conventional words may be insufficient to capture an invention. This rule was not created to allow an Applicant to skirt the prior art and throw sand in the Examiner’s eyes by refusing to state what was actually allegedly invented.

Further analysis of this “definition” only serves to confuse matters. While no structure is intended, the structure that is apparently implied by intercalated or metal-doped carbon is excluded from this definition. *See Id.* (“The ‘pillared’ carbon material thus differs from metal-doped or intercalated carbon materials in that the alteration (e.g. increased interlayer or intertube distance) is

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comparatively stable."). How do Applicants know this when they have done no testing to determine this? Did the computer also "synthesize" a metal-doped carbon material and test them itself?

In sum, it is not clear what any of the claims cover, as pillared can apparently mean anything or nothing. The fact that Applicants cannot describe any structure or any method of making the composition weighs heavily in supporting the conclusion that they did not possess anything for purposes of satisfying the written description requirement.

2. Review the Entire Application to Understand How Applicant Provides Support for the Claimed Invention Including Each Element and/or Step:

The fact that Applicants have not recited any structure and explicitly intend that no structure apply to the claims precludes any finding of support in the specification. What is a pillar when a pillar can be anything or nothing? Where is it in the specification? Could air be a pillar? Could empty space be a pillar?

3. Determine Whether There is Sufficient Written Description to Inform a Skilled Artisan That Applicant was in Possession of the Claimed Invention as a Whole at the Time the Application Was Filed

Possession can be shown in any number of ways, for example describing an actual reduction to practice or a clear depiction of the invention in the drawings. It is noted that Applicants have presented no reduction to practice

whatsoever. While certain drawings are present, it is unclear if these show a pillar or not, as after all, "no particular form of structure is intended by the use of this terminology." (S. 7: [00028]).

Applicants can show possession by identifying characteristics of the claimed invention. Here, Applicants allege that the "pillared" material is more stable than doped or intercalated carbon materials. (S. 7: [0028]). This allegation is unfounded in light of the absence of an actual reduction to practice. How do Applicants know that it is more stable than intercalated graphite? Did they compare their material (that is to say, material that was actually produced versus simulated on a computer) with intercalated graphite? If so, it is not present in the specification.

Finally the Examiner notes that the only thing remotely coming close to demonstrating possession is a computer simulation (that is, something that does not involve physically making or possessing the claimed subject matter with the claimed process of making). This is not persuasive in the slightest. How do Applicants know the material will arrange itself in the manner it is purported to, *especially* when no manner in particular is being claimed? *See* (S. 7: [00028]).

The findings and rationale expressed in the non-final office action dated 11/30/2006 and final office action dated 8/17/2007 with respect to the written description

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rejection are still considered relevant and probative, and as such, are expressly incorporated herein in their entirety. Note especially the capricious statements identified in the specification related to the method of making as “generally not limited to a particular procedure or series of steps.” (S. 9: [00037] *et seq.*). While conceptually, this makes sense for a material that has no structure, it is insufficient to demonstrate possession. Furthermore, nanotechnology is of particular interest because it represents more than a change of size; it is a unique phenomenon. Thus, (see paragraph 43) standard macroscopic techniques may or may not be effective. Apparently, applicant did not even attempt them.

Claims 1-43 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The analysis for determining whether a claim is supported by the disclosure is cast in terms of whether “undue experimentation” is necessary to practice the invention. *See* MPEP 2164.01. In examining the claims in light of the supporting disclosure, the Federal Circuit has provided a non-exclusive list of factors to consider in determining whether a disclosure is enabling. *See generally In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988). These factors include:

- a. The breadth of the claims;
- b. The nature of the invention;

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- c. The state of the prior art;
- d. The level of one of ordinary skill;
- e. The level of predictability in the art;
- f. The amount of direction provided by the inventor;
- g. The existence of working examples; and
- i. The quantity of experimentation needed to make or use the invention based on the content of the disclosure

Id. “Whether undue experimentation is needed is not a single, simple factual determination, but rather is a conclusion reached by weighing many factual considerations.” *Id.* Examiner has considered all factors in light of all claims rejected makes the following findings of fact:

a. The breadth of the claims

Claims 1 and 17 are the broadest claim. As noted above, they are extremely broad, as pillared can mean anything. (S. 7: [00028]).

b. The nature of the invention

The nature of the invention is allegedly directed towards some sort of carbon composition. What kind is unclear, as no structure is intended. (S. 7: [00028]).

c. The state of the prior art and the level of one of ordinary skill

As noted in prior office actions, skilled artisans in the field of nanotechnology tend to be highly skilled. They are not, however, soothsayers that can predict what unlimited structures might result from unlimited chemical reactions. *See* (S. 7; [00028]) (no structure) *and* (S. 9: [00037]) (any number of steps). Given that any number of steps are contemplated, the field of prior art is arguably infinite. Would smashing lithium with the graphite from a pencil with a hammer “pillar” it? Without knowing what Applicants are claiming, it is exceptionally difficult to ascertain the state of the prior art.

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d. The level of predictability in the art

In an art that encompasses any or no particular structure, everything is either totally predictable or totally unpredictable. If its totally predictable, its obvious. If its totally unpredictable, then quite clearly Applicants' disclosure (which fails to disclose a single working embodiment) fails for lack of enablement.

Furthermore, note the remarks and the references provided in the final rejection dated 8/17/2007, p. 7. The Wang reference teaches that what "happens on a computer" is not "what happens in real life," *i.e.* there is unpredictability in this field of hydrogen storage. This factor weighs heavily in supporting the conclusion that the disclosure is not enabling.

e. The amount of direction provided by the inventor

As noted in previous office actions, the inventor has provided scant if any direction. A "Diels-Alder type" reaction is mentioned. (S. 10: [00041]). What is a Diels-Alder *type* reaction? If this language was in the claim, it would be rejected as indefinite. If its not a Diels-Alder reaction, what is it? Is it kind-of but not quite an Diels-Alder reaction? Is it a Diels-Alder reaction sometimes but not all the time? Is it one part Diels-Alder and one part "secret reaction" that Applicants have failed to disclose? What? Where is this information in the specification? Other reactions are mentioned. *Id.* What are these? Where are they in the specification? Can Applicants point to one partially complete set of instructions as to how to make a composition of matter that has no particular structure? How can a computer make a composition of matter? Where is this information in the specification?

f. The existence of working examples

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No working examples have been presented. Applicants have eschewed experimental work in a laboratory for simulation on a computer screen. *See* (S. 13: [00050]). This factor weighs heavily in supporting the conclusion that the disclosure is not enabling.

g. The quantity of experimentation needed to make or use the invention based on the content of the disclosure

Applicants are claiming a process and the product itself of a material that has no particular structure, and can be made by any technique. Applicants themselves have not made it, but were able to make their computer software generate a picture that may or may not be what is being claimed. Again, nobody knows, as any structure is possible. (S. 7: [00028]).

One seeking to practice this invention with the disclosure isn't even left with "Diels-Alder." They are left with "Diels-Alder type." Thus, Applicants urge that with chemistry that is kind-of but not-quite defined, no definition of the product, and no working examples, the disclosure is enabled.

In light of the preceding findings and analysis, arguably infinite and certainly undue experimentation is needed to practice the invention. The findings and rationale expressed in the non-final office action dated 11/30/2006 and final office action dated 8/17/2007 with respect to the enablement rejection are still considered relevant and probative, and as such, are expressly incorporated herein in their entirety.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear from the claims and description if the term “pillared” is to imply any particular structure or not. *See* (S. 7: [00028]) *and* discussion *supra*. Presumably any structure that has something (even air or empty space) inbetween layers of carbon would be pillared.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action. The entire reference teaches each and every limitation of the rejected claims. The pinpoint citations provided are in no way to be construed as limitations of the teachings of the reference, but rather illustrative of particular instances where the teachings may be found.

Claims 1-6, 8-16, and 37-43 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. 4,423,125 to Basu.

With respect to Claims 1-5 and 37-43, Basu discloses lithium intercalated graphite, i.e. graphite separated by lithium. (Basu 2: 13 *et seq.*). As to Claim 6, Basu discloses high purity graphite, but does not state what degree of purity. *Id.* As such, it is expected that an impurity is present. As to Claim 8-10, Basu discloses a ration of metal to carbon of 1:6. (Basu 2: 8-11). As to Claims 11-16, as noted above, Basu discloses the elements and ratios claimed. This is the evidence offered tending to show inherency. It is

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expected that the claimed properties are present, owing to the fact that Basu teaches the elements and the ratios claimed. “[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency’ under 35 U.S.C. 102, on prima facie obviousness’ under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted].” The burden of proof is similar to that required with respect to product-by-process claims. *In re Fitzgerald*, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)). It appears from the specification that Li is the pillaring agent, so not differences are seen.

Claims 1-6, 8-16 and 37-43 are rejected under 35 U.S.C. 102(b) as being anticipated by US 4,304,825 to Basu.

With respect to Claims 1-5 and 37-43, Basu discloses lithium intercalated graphite. (Basu 2: 15 *et seq*). As to Claim 6, Basu discloses “reasonably pure” graphite, but does not state what degree of purity. (Basu 2: 46). As such, it is expected that an impurity is present. As to Claim 8-10, Basu discloses a ratio of metal to carbon. (Basu 1: 47-49). As to Claims 11-16, as noted above, Basu discloses the elements and ratios claimed. This is the evidence offered tending to show inherency. It is expected that the claimed properties are present, owing to the fact that Basu teaches the elements and the ratios claimed. “[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency’ under 35 U.S.C. 102, on prima facie obviousness’ under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the

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same...[footnote omitted].” The burden of proof is similar to that required with respect to product-by-process claims. *In re Fitzgerald*, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

Claims 1-16 and 37-43 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. 5,358,802 to Mayer, et al.

With respect to Claim 1-5, 8-10 and 37-43 Mayer teaches carbon material separated by lithium with the claimed ratio. *See e.g.* (Mayer 1: 47-56). As to Claims 6-7, boron is taught. (Mayer 4: 3). As to Claims 11-16, as noted above, Mayer discloses the elements and ratios claimed. This is the evidence offered tending to show inherency. It is expected that the claimed properties are present, owing to the fact that Mayer teaches the elements and the ratios claimed. “[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency’ under 35 U.S.C. 102, on prima facie obviousness’ under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted].” The burden of proof is similar to that required with respect to product-by-process claims. *In re Fitzgerald*, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

Claims 1-6, 8-16, and 37-43 are rejected under 35 U.S.C. 102(b) as being anticipated by Diederich, *Covalent fullerene chemistry*, Pure & Appl. Chem. 1997; 69(3): 395-400.

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All figures in Diederich are being interpreted as disclosing a “pillar” between carbon material. Metals (Na) are taught. Given that Applicants themselves say this is how you make whatever a “pillar” is, *see* (Remarks of 2/19/2008 at 12), it is expected that all properties claimed are necessarily disclosed. “[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency’ under 35 U.S.C. 102, on prima facie obviousness’ under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted].” The burden of proof is similar to that required with respect to product-by-process claims. *In re Fitzgerald*, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action. The references cited teach each and every limitation of the rejected claims. The pinpoint citations provided are in no way to be construed as limitations of the teachings of the reference, but rather illustrative of particular instances where the teachings may be found. As to the rejection under 35 U.S.C. §§ 102/103, where the applicant claims a composition in terms of a function, property or characteristic and the composition of the prior art is the same as that of the claim but the function is not explicitly disclosed by the reference, the Examiner may make a rejection under both 35

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U.S.C. 102 and 103, expressed as a 102/103 rejection. *See* MPEP 2112 III. (discussing 102/103 rejections).

Claims 1-6, 8-16, and 37-43 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. 4,423,125 to Basu.

The preceding discussion of Basu accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. See above with respect to 102/103 rejections.

Claims 1-6, 8-16 and 37-43 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over US 4,304,825 to Basu.

The preceding discussion of Basu accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. See above with respect to 102/103 rejections.

Claims 1-16 and 37-43 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. 5,358,802 to Mayer, et al.

The preceding discussion of Mayer accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. See above with respect to 102/103 rejections.

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Claims 1-6, 8-16, and 37-43 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Diederich, *Covalent fullerene chemistry*, Pure & Appl. Chem. 1997; 69(3): 395-400.

The preceding discussion of Diederich accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. See above with respect to 102/103 rejections.

Claims 1-43 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Applicants admissions.

At the outset, the Examiner notes that "a statement by an applicant during prosecution identifying certain matter not the work of the inventor as "prior art" is an admission that the matter is prior art." *Riverwood Int'l Corp. v. R.A. Jones & Co.*, 324 F.3d 1346, 1354, 66 USPQ2d 1331, 1337 (Fed. Cir. 2003) (citations omitted). Applicants have stated on the record:

The methods and compositions of the instant application rely on synthetic procedures that are well known in the art, but had not been used as described in the specification prior to the filing date of the application. The fact that "a number of techniques or steps may be utilized" does not diminish from the fact that ***such techniques or steps are: (a) known in the art; and/or (b) described in the specification.***

(Remarks of 5/29/2007 at 11).

Experimental details for carrying out such a reaction are well known and widely available to the skilled artisan (e.g., in references cited by Inagaki). Numerical values for the "low concentration" are not specified, since such empirical details would be subject to optimization and

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may differ for each material (or even for various uses of the same material). The skilled artisan, however, would know how to optimize such reaction conditions using routine procedures; determining the optimal concentration would not require "undue" experimentation.

...

In general, therefore, each of the steps required to prepare compositions ACCORDING TO THE CLAIMS are well known and understood in the art. Even if the preparation of an optimized composition would require optimization of the reaction conditions in one or more of the above- described steps, the preparation of any composition according to the claims is immediately practicable by the skilled artisan based on the disclosure of the application

(Remarks of 5/29/2007 at 13) (emphasis added).

The Examiner couldn't have said it better. Regrettably, optimization of that which is known does not impart patentability. *See e.g. In re Boesch*, 205 USPQ 215 (CCPA 1980), *Pfizer, Inc. v. Apotex, Inc.*, 82 USPQ2D 1321 (Fed. Cir. 2007). In their remarks of 2/19/2008, Applicants allege that "applicants did not state that the claimed invention is well known in the art. (Remarks of 2/19/2008). Actually, they did. The Examiner is interpreting the part where Applicants stated on and for the record that "each of the steps required to prepare compositions according to the claims are well known and understood in the art" to mean that "each of the steps required to prepare compositions according to the claims are well known and understood in the art." *See (Remarks of 5/29/2007 at 13).*

To the extent that Applicants believe they only admitted the method of making the composition was old but the composition is new, if the method is known, it is expected that the resulting product is known. This is the evidence offered to prove inherency.

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“[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency’ under 35 U.S.C. 102, on prima facie obviousness’ under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted].” The burden of proof is similar to that required with respect to product-by-process claims. *In re Fitzgerald*, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

Claims 1-43 are rejected under under 35 U.S.C. 103(a) as obvious over Applicants admissions.

The preceding discussion of Applicants admissions *supra* is expressly incorporated herein by reference. The Examiner is taking official notice that commercial chemical simulation software is old and known. In support of taking official notice, the Examiner cites to footnote 18 in Applicants' Application. If Applicants persist in arguing the merits of computers in making compositions, it is prima facie obvious to use a computer program that can deliver predictable results to design and optimize compositions and methods that employ admittedly old and known chemistry, noting that the program was not developed by the applicant. Updating old chemistry with modern electronics and computational techniques does not impart patentability. *Cf. Leapfrog Enterprises, Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1161 (noting that applying modern electronics to prior mechanical devices would have been reasonably obvious to one of ordinary skill in the art).

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Claims 1-25 and 27-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,653,951 to Rodriguez in view of Inagaki, et al., *Determining factors for the intercalation into carbon materials from organic solutions*, 39 Carbon 1083 (2001).

With respect to Claims 1-16 Rodriguez describes layered carbon composition (Rodriguez 2: 48-51), that can be doped with a metal. (Rodriguez 8: 40-49). To the extent Rodriguez may not disclose a pillared material – which of course can mean anything or nothing - Inagaki describes the intercalation of carbon materials with an organic ligand. (Inagaki 1084). The composition of Rodriguez '951 would be modified by performing the intercalation reaction described by Inagaki. One would be motivated to make this combination due to the ability to alter the interstices in the layered carbon material so as to affect the materials ability to store gas. *See e.g.* (Rodriguez 3, 35 *et seq.*) (discussing the affect of interstices and crystallinity on gas storage) *and* Inagaki, 39 Carbon at 1086 (discussing the affect that different metal ions have on spacing between carbon layers). This discussion of the rejection of Claim 1, including the motivation to combine the references, is incorporated by reference herein to all claims depending on Claim 1. It is expected that any properties claimed are present, owing to the similarity of carbon materials used. “[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency’ under 35 U.S.C. 102, on prima facie obviousness’ under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted].” The burden of proof is similar to that required with respect to product-by-process claims. *In re Fitzgerald*, 619 F.2d 67, 70, 205 USPQ

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594, 596 (CCPA 1980) (quoting *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

With respect to Claims 17-31 and 36 Rodriguez describes preparing a carbon composition that is doped with a metal. To the extent Rodriguez may not disclose preparing a ligand, Inagaki describes providing a solvated alkali metal containing organic ligands, combining it with a carbon material and forming a “pillared” carbon material. *See generally* Inagaki, 39 Carbon at 1084 (“2. Intercalation reaction”). The motivation for combining the references as set forth in the rejection of Claim 1 is relied upon in support of the rejection of Claim 17.

As to Claim 18, Inagaki discloses Li, Na and K. *Id.* As to Claim 21-22, the discussion of the rejection of Claim 4 is relied upon. As to Claim 23, Inagaki teaches a number of heterocyclic solvents. Inagaki, 39 Carbon at 1084. As to Claim 24, Inagaki teaches unidentate and bidentate ethers as solvents. *Id.* As to Claim 25, 2,5-dihydrofuran is not explicitly taught, but reasonably suggested by Inagaki’s teaching of unidentate and bidentate ethers. *Id.* As to Claim 27, Rodriguez discloses an impurity. (Rodriguez 8: 40-49). As to Claim 35, Rodriguez ‘951 discloses an interlayer distance of 0.67 nanometers, equivalent to 6.7 angstroms. (Rodriguez 3: 27).

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,653,951 to Rodriguez in view of Inagaki, et al., *Determining factors for the intercalation into carbon materials from organic solutions*, 39 Carbon 1083 (2001) and in further view of Janot, et al., *Ball Milling: a new route for the synthesis of superdense lithium GICs*, 39 Carbon 1931 (2001).

With respect to Claim 26, to the extent Rodriguez does not disclose ball milling. Janot describes ball milling to intercalate lithium into graphite. One would be motivated

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to combine the ball milling technique of Janot to dope a metal as taught by Rodriguez because the technique results in “a well-crystallized compound.” Janot, 39 Carbon at 1931. *See also* (Rodriguez at 3, 35 *et seq.*) (discussing the importance of crystallinity).

Conclusion

Other rejections could have been crafted to reject a composition that doesn't have any structure. In deciding whether to pursue prosecution, Applicants should be able to answer three questions: (1) What is a “pillar?” (2) How do you make a “pillar?” and (3) Where is this information in the Specification? Because the Examiner could not answer any of these questions (and it doesn't appear Applicants can either) the case is and will continue to be rejected.

All amendments made in response to this Office Action must be accompanied by a pinpoint citation to the Specification (i.e. page and paragraph or line number) to indicate where Applicants are drawing their support..

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel C. McCracken whose telephone number is (571) 272-6537. The examiner can normally be reached on Monday through Friday, 9 AM - 6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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